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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/551,672	09/30/2005	Hiromi Matsumura	278224US3X PCT	5573
22850	7590	04/20/2009	EXAMINER	
OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C.			FOGARTY, CAITLIN ANNIE	
1940 DUKE STREET				
ALEXANDRIA, VA 22314			ART UNIT	PAPER NUMBER
			1793	
			NOTIFICATION DATE	DELIVERY MODE
			04/20/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/551,672	<b>Applicant(s)</b> MATSUMURA ET AL.
	<b>Examiner</b> CAITLIN FOGARTY	<b>Art Unit</b> 1793

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
  - If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
  - Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) Responsive to communication(s) filed on 15 January 2009.  
 2a) This action is FINAL.      2b) This action is non-final.  
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) Claim(s) 1-4, 6, 14 and 17 is/are pending in the application.  
 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
 5) Claim(s) \_\_\_\_\_ is/are allowed.  
 6) Claim(s) 1-4, 6, 14 and 17 is/are rejected.  
 7) Claim(s) \_\_\_\_\_ is/are objected to.  
 8) Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) The specification is objected to by the Examiner.  
 10) The drawing(s) filed on 30 September 2005 is/are: a) accepted or b) objected to by the Examiner.  
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
 a) All    b) Some \* c) None of:  
 1. Certified copies of the priority documents have been received.  
 2. Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- 1) Notice of References Cited (PTO-892)  
 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)  
 3) Information Disclosure Statement(s) (PTO/SB/08)  
 Paper No(s)/Mail Date 12/22/2008
- 4) Interview Summary (PTO-413)  
 Paper No(s)/Mail Date \_\_\_\_\_  
 5) Notice of Informal Patent Application  
 6) Other: \_\_\_\_\_

**DETAILED ACTION**

***Status of Claims***

1. Claims 1, 4 – 6, 14, and 17 are pending where claim 1 has been amended.

Claims 2, 3, 7 – 13, 15, 16, and 18 – 20 have been cancelled.

***Status of Previous Rejections***

2. The 35 U.S.C. 103(a) rejection of claims 1 – 6 and 12 – 17 as being unpatentable over the "Effects of Friction Stir Welding on Microstructure of 7075 Aluminum" by Rhodes et al. in view of "Corrosion-fatigue crack growth in friction stir welded Al 7050" by Pao et al. has been maintained.

***Priority***

3. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

***Information Disclosure Statement***

4. The information disclosure statement (IDS) was submitted on December 22, 2008. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statement is being considered by the examiner.

***Claim Objections***

5. Claim 4 is objected to because of the following informalities: claim 4 is labeled as "Currently Amended" however it has not been amended and therefore should be labeled "Previously Presented". Appropriate correction is required.

***Claim Rejections - 35 USC § 103***

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1, 4 – 6, 14, and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over the "Effects of Friction Stir Welding on Microstructure of 7075 Aluminum" by Rhodes et al. (cited in the IDS) in view of "Corrosion-fatigue crack growth in friction stir welded Al 7050" by Pao et al..

With respect to instant claims 1 and 5, p. 70 of Rhodes discloses an aluminum alloy prepared by the butt joining, through friction stir welding, of aluminum sheets. Also, p. 73 of Rhodes teaches that the weld nugget (joined portion) has an average particle diameter of 60-80 nm and that the average particle diameter of the intermetallic compound in the parent metal (non-joined portion) is 50-75 nm. Therefore, the average particle diameter of the intermetallic compound in the weld nugget is within the range of 60% to 130% of the average particle diameter of the intermetallic compound in the parent metal. Also, p. 73 of Rhodes discloses that the weld nugget contains a high density of randomly oriented intragranular precipitates. This suggest that the density of precipitates increased and consequently the average distance between adjacent intermetallic compound particles decreased from that of the parent metal which is within the range recited in instant claim 1. In addition, p. 73 and 74 of Rhodes teach that the weld nugget has a recrystallized, fine equiaxed grain structure on the order of 2-4  $\mu\text{m}$  in diameter and that the grains of the parent metal were elongated grains. Therefore, the grains in the weld nugget have smaller diameters than those of the parent metal which

is within the range disclosed in instant claim 1. The joined portion of the aluminum alloy of Rhodes is produced by friction stir welding.

In regards to instant claims 4 and 14, p. 70 of Rhodes discloses an aluminum alloy prepared by the butt joining, through friction stir welding, of aluminum sheets. Also, p. 69 of Rhodes teaches that the friction stir welded joint does not have the dendritic structure typical of a fusion-weld joint.

Rhodes differs from instant claims 1 and 4 because it does not teach that the aluminum alloy prepared by the butt joining of metal sheets is a sputtering target. However, it would have been obvious to one of ordinary skill in the art that the aluminum alloy of Rhodes may be used as a sputtering target since it is in sheet form and aluminum is a common sputtering target material. Rhodes also differs from instant claims 1 and 4 because it does not teach that the joined portion has a structure characteristic of the recrystallization of the material of the joined portion by annealing and substantially without a crystal orientation characteristic of plastic flow due to friction stir welding. However, it would have been obvious to one of ordinary skill in the art to anneal the joined portion after friction stir welding in order to re-precipitate the fine strengthening phase and restore the strength in the weld region as evidenced by p. 607 of Pao which also teaches an aluminum alloy prepared by butt joining, through friction stir welding, of aluminum plates on p. 605 and 606. Therefore, the joined portion of the aluminum alloy of Rhodes in view of Pao would have a recrystallized structure characteristic of annealing and substantially without a crystal orientation characteristic of plastic flow due to friction stir welding.

Rhodes differs from instant claims 6 and 17 because it does not teach that the target has a planar area of 1 m<sup>2</sup> or more. However, it would have been obvious to one of ordinary skill in the art to make the sputtering target as large as necessary using butt joining of metal sheets through friction stir welding in order to obtain the desired size of the target where the properties of the joined portion are very similar to the properties of the non-joined portion. See MPEP 2144.04 IV A.

***Response to Arguments***

8. Applicant's arguments filed January 15, 2009 have been fully considered but they are not persuasive.

*Arguments are summarized as follows:*

Benefits in the uniformity of layer production, as would arise in the fabrication of a sputtering target would not have been expected in view of Rhodes et al. This would have been an unpredictable result. Pao et al. teaches that the post FSW annealing has the benefit of restoring the strength of the weld region. It thus confirms that strength, not uniformity in sputtering, is the known or predictable result to be conveyed by both FSW and post FSW annealing. Thus, providing FSW with post FSW annealing in a sputtering target would not have been obvious to one skilled in the art, despite the fact that both were known, *per se*, because they provide unpredictable results, i.e. they do not improve sputtering targets "in the same way" as for other products. Strength is not a concern in sputtering targets; the concern there is uniform sputtering for creating uniform sputtered layer characteristics.

*Examiner's responses are as follows:*

The Examiner maintains the position that it would have been obvious to one of ordinary skill in the art to anneal the joined portion of Rhodes after friction stir welding in order to re-precipitate the fine strengthening phase and restore the strength in the weld region as evidenced by p. 607 of Pao which also teaches an aluminum alloy prepared by butt joining, through FSW of aluminum plates on p. 605 and 606. Also, the Examiner takes the position that strength is a concern in sputtering targets because a sputtering target must have a high strength in order to avoid cracking during sputtering. In the alternative, it is not necessary that the prior art suggest the combination to achieve the same advantage or result discovered by applicant. See MPEP 2144 IV.

***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CAITLIN FOGARTY whose telephone number is (571)270-3589. The examiner can normally be reached on Monday - Friday 8:00 AM - 5:30 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Roy King/  
Supervisory Patent Examiner, Art  
Unit 1793

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